



The role of social representation in producing public spaces: Amman as a case study

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ABSTRACT

According to Henri Lefebvre's theory, socially produced space results from the interaction between social representation and physical space. This socio-spatial interaction creates a new space that can shape the behavior of its users. Despite growing interest in socio-spatial dynamics, little research has explored how urban protests shape and are shaped by space, especially in cities such as Amman, with diverse social dynamics. Understanding this phenomenon is essential for addressing urban challenges such as spatial inequality and public participation. This paper analyzes the interaction between urban space and social action during Amman's major protest activities to study the concept of space production in Amman, Jordan. Due to its fast urbanization and sociopolitical tensions with neighboring countries, Amman provides an ideal setting for researching the relationship between space and protests.

The study uses case studies of two main urban spaces: the Downtown area and the 4th Circle area. The paper employed qualitative and quantitative research methods. First, a coding method using MAXQDA was used to identify the different themes and patterns of behavior in space during protests. Second, Space Syntax was employed to calculate the connectivity and integration of the spaces identified in the previous stage. This study traces the three main moments in Henri Lefebvre's conceived, perceived, and lived spaces triad. The results suggest that social representations are inseparable from the features of the society in which they develop.

1. Introduction

Public spaces, such as streets, parks, and plazas, are integral to urban environments, serving as sites for everyday activities and collective expression. These spaces, typically owned and managed by the government, provide legal access to all and fall under the purview of urban planners (Parmar, 2021).

Beyond their functional roles, public spaces shape a city's cultural landscape, influencing perceptions of identity, community, and citizenship (Siláči & Vitková, 2017). Policymakers often approach public spaces through pragmatic concerns (health, safety, welfare), yet their significance extends to deeper socio-political dimensions—memory, resistance, and democratic engagement (Purcell, 2022).

Recent scholarship emphasizes the dialectical nature of public space, particularly through Henri Lefebvre's triad of conceived (planned), perceived (experienced), and lived (appropriated) space (Lefebvre et al., 1991). This framework reveals how spaces are not static but continually reshaped through social practices (Kostaki et al., 2024). For instance, participatory governance initiatives, as seen in temporary uses of abandoned urban areas, demonstrate how marginalized groups reclaim

spaces, challenging top-down planning (Kostaki et al., 2024). Similarly, Purcell (2022) argues that democratic space emerges through negotiation, where lived experiences disrupt dominant spatial orders. These insights underscore the need to examine public spaces as dynamic arenas where social identities and political claims are enacted.

The significance of social representation in shaping public spaces is of paramount importance. Social representations—collective understanding and perception of space—emerge through interactions and affect how people view and transform their surroundings (Bettencourt, 2020; Furini & Góes, 2002). These representations are created, evolved, and reshaped within the public realm (Bettencourt, 2020). The formation of social representations and public life relies not solely on individuals or society but on the mediating spaces that connect and divide them at the same time (Jovchelovitch, 2001).

This study explores the connection between physical environments and social interactions, utilizing perspectives from sociology, architecture, urban studies, and philosophy. The main objective is to investigate the social construction of public spaces in Amman, Jordan, emphasizing the complex relationship between the physical surroundings and social conduct. The research looks into how social identities manifest in the

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spatial layout of Amman, particularly through an examination of two significant protest locations: downtown Amman and the 4th Circle.

Although previous research has explored Lefebvrian frameworks in global north settings, limited investigation has been conducted into how these processes occur in Middle Eastern cities, where political expression is often constrained. The protest spaces in Amman offer a distinctive viewpoint on how physical environments are adapted for activism, highlighting broader themes of citizenship and spatial justice.

This research contributes to the debate about how social groups temporarily alter public spaces, creating new meanings and functions that mirror their shared identities and actions. By exploring these evolving relationships, the study unfolds how communities adjust and reinterpret urban environments, offering valuable insights into the connection between spatial design and social behavior.

Notably, protest activities in Amman have predominantly occurred in those two main public areas: downtown and the 4th Circle. These spaces hold significant importance as central nodes for public gatherings, shaped by their distinct historical, political, and social settings, reflecting the collective identity of Amman's diverse population. Additionally, the 4th Circle, an open space near governmental institutions, symbolizes activism and public protest.

By examining how these two public spaces function as sites for assembly and platforms for social activism and identity expression, this study explores the emergence and evolution of new spatial configurations driven by collective action. Drawing on [Kostaki et al. \(2024\)](#) conceptual framework, it analyzes how social practices and group activities shape lived experiences of space. In parallel, [Purcell \(2022\)](#) theory of democratic space provides a framework for understanding how these practices engage with and challenge hegemonic spatial narratives.

Using spatial analysis and archival research, this study demonstrates how public spaces in Amman acquire meaning and significance through their utilization and transformation during protests, particularly when stakeholders are involved in their planning and governance. It highlights the influence of political, economic, and social structures and reveals the tension between state-planned (conceived) and activist-appropriated (lived) space.

2. Literature review

Recently, public spaces have been designed by a small group of specialists primarily concerned with economic or visual objectives, such as their layout, accessibility, attraction, the public space's spatial harmony, and symbolic landmarks ([Mahmoud & El Rahman, 2016](#)). This approach has drawn criticism for neglecting the social dimensions of urban design, which are crucial for fostering inclusive and interactive environments. On the other hand, the concept of socially created places acknowledges that the city is a dynamic, collaborative structure molded by its people. In line with current demands for participatory urban planning, this viewpoint highlights the significance of public areas that promote social interactions ([Madanipour, 2015](#)).

[Lefebvre et al. \(1991\)](#) coined the term "social production of space," signifying the intentional formation of new spaces. He argued that space is not merely a passive container but is actively produced through daily activities, which is foundational in understanding the interplay between social practices and physical environments and providing insights into urban dynamics, societal responsibilities, and political aspirations ([Lefebvre et al., 1991](#)). His research has significantly impacted urban studies by providing a framework for examining how space can be used as a vehicle for social change and expression ([Elden, 2004](#)).

This concept resonates with [Habermas's \(1989\)](#) idea of the public sphere. Habermas believed that people convene to deliberate on common social issues. This philosophical foundation is strengthened by Karl Marx and Friedrich Engels' dialectical materialism and Antonio Gramsci's idea of hegemony, which emphasizes the power dynamics implicit in spatial production ([Harvey, 1990](#); [Soja, 2008](#); [Habermas, 1989](#); [Jonathan, 1999](#)).

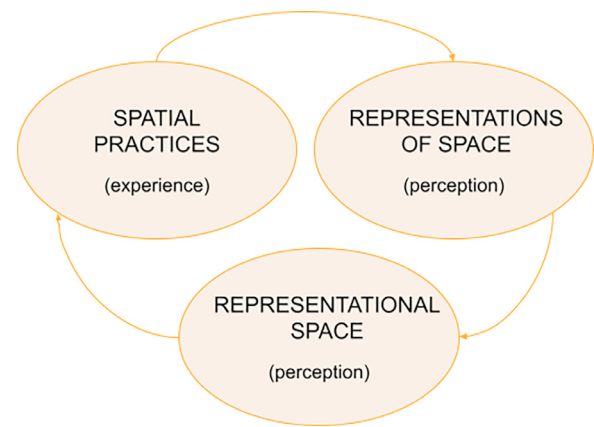


Fig. 1. The three concepts of production of space by [Lefebvre et al. \(1991\)](#).

"The Production of Space" by Lefebvre, initially published in French in 1974, has been widely acclaimed as a comprehensive and revolutionary analysis of spatial concepts. It has emerged as a key point of reference for individuals interested in architecture with social awareness. Lefebvre challenged the functionalist urban model in the 1950s, contesting the conventional view of the city as merely a product and instead likening it to a collective piece of art created by its inhabitants. His writings illustrated an interdependent relationship between representation, creativity, and tangible spaces. The book offers conceptual frameworks for interpreting spatial existence's social, political, and historical dimensions.

Scholars such as [Madanipour \(1996\)](#) and [Gehl \(2011\)](#) have investigated the practical consequences of Lefebvre's theory, emphasizing the importance of social interactions in defining public spaces. Madanipour's urban design work emphasizes the necessity of inclusive public spaces that represent the diversity of urban life, whereas Gehl promotes human-centered urban planning that prioritizes walkability and social engagement. These findings highlight the importance of including social factors in urban planning in order to solve the inadequacies of traditional approaches that focus primarily on economic or aesthetic aims.

Spatial practice is viewed as a unified experience shaped by everyday activities such as shopping, playing, traveling, and working ([Forty, 2004](#)), (Fig. 1). Space representation refers to how planners and architects understand space using plans, designs, drawings, and maps. Artists and others who strive to explain alternate spaces inhabit representational spaces in their minds ([Elden, 2007](#); [McCann, 1999](#)).

3. Theoretical backgrounds

3.1. Public space, backgrounds, and theories

The term 'public space' denotes a space subject to dispute, hosting diverse identities and allowing for a comprehensive understanding of spaces in a dynamic manner. Due to ongoing social dynamics, it represents a multi-faceted social creation arising from physical development and interpretation ([Lefebvre et al., 1991](#)). Lefebvre points out that modern epistemology and its philosophical predecessors view space as a "material thing" or a "mental place" that is physical and embedded in our daily practices. This environment can be understood by charting its creation process.

Public spaces are the heart of a city and influence lifestyles, well-being, and public health. A wide body of research proves the benefits of public spaces, from social and educational to environmental and economic ([Costa & Patrício, 2020](#)). Public spaces are integral to cities' culture, often shaping a city's image and identity. They are also inextricably linked to ideas of community, memory, citizenship, identity, and freedom of expression. A prominent illustration of this can be seen in the

transformation of names such as Tahrir Square, Puerta del Sol, Zuccotti Park, and Gezi Park—public squares that have come to represent political significance in recent years. These public assemblies are distinct in their urban presence. This demonstrates that public spaces serve many functional and symbolic purposes, emphasizing their multidimensional nature. (UNESCO, 2016) Furthermore, this complexity enriches public spaces by encompassing diverse roles and significance, including identity, community, and a sense of connection or 'place', which signifies belonging to a specific location. Personal experiences and intangible sentiments shape this concept.

Local knowledge gives significance to certain urban spaces due to cultural and social activities there. These place-based social spots constitute a rallying point for constructing a network of significant civic sites (Petrescu & Trogal, 2017; Riphagen & Woltering, 2018).

In addition to socio-spatial features, public spaces must consider all functions, services, benefits, components, and factors and their interactions. Thompson (2002) explored what urban open space should deliver in the 21st century, including the spatial and social implications of a particular socio-economic mode of life, changing values, and attitudes towards nature and sustainability. He concluded that urban open spaces must provide appropriate places where all groups can meet and interact socially (Thompson, 2002). They must experience cultural diversity, engage with natural landscapes, conserve public and private memories, and serve a central function in defining the identity of various societies (Habermas, 1989).

3.2. The rationale behind social representations and public spaces

Public spaces are dynamic social constructs shaped by collective values and practices, rather than merely physical environments. Henri Lefebvre's theory of the production of space (1991) offers a foundational perspective for interpreting this relationship, emphasizing that this concept of spatial production is rooted in historical and philosophical thought rather than in architectural theory. According to this theory, space is a complex social construct shaped by shared meanings and values, functioning as a social product. Consequently, any public space has an impact on spatial practices and perceptions. Lefebvre argues that space and society are deeply interconnected. He views space as a social construct formed through three interrelated dimensions: perceived space (the physical and material aspects), conceived space (the planned and organized spaces shaped by authorities), and lived space (the everyday experiences and personal appropriations by individuals), where social tensions and contradictions become visible. This triadic framework highlights how the interaction between social agency and design intentions generates public spaces through ongoing dialectical tensions. Lefebvre asserts that space mirrors and reinforces societal structures, emphasizing that it is inherently dynamic and never neutral (Purcell, 2022).

On the other hand, the concept of "social representations" has been extensively examined by scholars such as Moscovici (1984), Jodelet (1991), and Marková (2003), and it serves as a useful complement to Lefebvre's spatial theory by illustrating how communities develop shared meanings around public spaces. Rateau et al. (2012) define social representations as "systems of opinions, knowledge, and beliefs" about elements within the social environment that are embedded within a group, culture, or social category. Jodelet (1991) describes these representations as "socially elaborated knowledge" that actively shapes perceptions of reality. This dynamic is particularly evident in public spaces, where diverse worldviews may intersect or conflict (Furini & Góes, 2002). Social representations operate dialectically—as symbolic frameworks that help individuals interpret their surroundings, influence behavior and social interactions, and are simultaneously shaped by the physical design of spaces. At the same time, collective actions such as protests or festivals can transform these spaces (Jovchelovitch, 2001).

Social representations are collectively held ideas, mental images, and beliefs that groups hold about cultural entities. These representations

help organize social life and guide group behaviors. They can carry either positive or negative connotations and significantly shape interpersonal interactions. Moscovici (1984), Jodelet (1991), Marková (2003), and Jovchelovitch (2001) described social representations as dynamic forms of symbolic knowledge—continuously created, developed, transformed, and disseminated—which contribute to the construction of social reality within the public sphere. According to Lahlou (2021), social representations aim to generate meaning while fostering diversity, dialogue, and equality in public life. They are co-constructed through collaborative processes in which individuals and groups establish meaningful connections among the elements that constitute these shared understandings.

When integrated with Lefebvre's theory of the production of space, the concept of social representations offers valuable insights, particularly concerning inclusivity and diversity. Public spaces that accommodate multiple representations through participatory design or culturally resonant features tend to promote equity and a stronger sense of belonging (Peinhardt, 2023).

Another important dimension that emerges from the synthesis of Lefebvre's theory and social representation is the interplay of conflict and coexistence. Public spaces thrive when they acknowledge disagreement and diversity of perspectives, echoing Arendt (1958) critique of the diminishing divide between public and private realms. Moreover, everyday practices—such as protests and festivals—not only constitute lived spaces but also have the power to reshape them continuously (Kostaki et al., 2024).

In this dual role, public spaces are physically constructed through design and governance and socially produced through collective representations and actions. These two dimensions—design intentions and lived experiences—constantly negotiate the meaning and function of public spaces (Kostaki et al., 2024; Peinhardt, 2023).

This study investigates how these dynamics unfold in the specific context of Amman's protest sites, exploring the interaction between spatial production and the production of social meaning.

3.3. The social production of space: social representation, public spaces, protest, the tripartite dialogue

Public space social production involves a tripartite dialogue between social representation, public spaces, and protest. Social processes play a crucial role in shaping and defining public spaces. The relationship between people and space is of vital strategic importance. Because of their public nature, public spaces provide an ideal setting for actions that need attention, such as demonstrations, strikes, sporting events, and even carnivals (Costa & Patrício, 2020). Studying the phenomenon of social production of spaces can be accomplished by looking at protest sites:

Acts of protest are perhaps the most symbolic embodiment of this social production of public space. Protest disrupts space's physical continuity and imposes a series of social relationships. Because they have changed, a realignment of tacit engagement rules is required (Fraser, 2016).

As a result, protest movements often utilize public spaces as platforms for expressing dissent, political determination, plurality, and conflict (Urban Next, 2018).

Fraser and others also identified protests in public spaces as a crucial source of information concerning space production. In addition to Judith Butler, other American philosophers have emphasized the importance of assembly and speech in reconfiguring public space materiality. They argue that urban public spaces are active containers where politics are constructed and enacted. According to Sevilla-Buitrago, protest is a dialect between participants and the urban built environment (Khawaja, 2015; McCann, 1999; Schwedler, 2012)

Social representation can be studied through assembly, which cannot be accomplished without many people and a suitable venue. Therefore, this action is defined by both its social and spatial dimensions. Addi-

tionally, it is logical for it to take place in a public space because it is accessible to the 'public', allowing us to gain a deeper understanding of the phenomenon of space production by studying the act of public assembly and by analyzing multiple cases and studying of public spaces used for public assemblies and how these assemblies have been redefined by their spatial manifestations.

Planning can give space political importance because it alters the established order of things and generates various distributions, creations, and relations. Due to the link between space and politics, planning should happen from, in, and within space. This will create meaningful spaces of representation that lead to better changes in people's lives (Colquhoun, 1989).

As Patrick Rafail and Batuman point out, urban spaces are shaped by specific orders hostile to everyday spatial routines. In Rafail's view, when cities become centers of economic, political, judicial, and cultural power, they serve as symbols and physical manifestations of state and corporate authority. These spaces are, therefore, prime locations for social representation (Lahlou, 2021; Rateau et al., 2012)

Spatial actions have begun transforming different realities into representational spaces. Public spaces serve as arenas where social representations are constructed, shared, and negotiated, influencing these environments' inclusivity, diversity, and quality.

Social representations design and use public spaces, guiding how different communities are represented and engaged within these public spaces. They often contribute to a city's image and identity and are integral to its culture. Furthermore, they are inextricably linked to ideas of community, memory, citizenship, identity, and freedom of expression. Names such as Tahrir Square, Puerta del Sol, Zuccotti Park, and Gezi Park - names of public squares - have become synonymous with political representation in recent years; rather than being related to a particular moment in time, a particular group of actors, or an ideology.

4. Social representation and challenges of public space in Amman

Amman, Jordan's capital, is a rapidly rising city with a distinct blend of traditional and modern influences. It has a limestone façade, car-dominated road networks, and sparse greenery. Public spaces in Amman have played an important role in urban life, providing platforms for social interaction and cultural expression.

Despite their importance, these areas have increasingly encountered issues, making them the focus of numerous studies. These studies emphasize the significance of inclusive, sustainable, and community-centered urban development that considers social dynamics while constructing public spaces.

Various studies have examined public spaces in Amman, Jordan. These studies underscore the importance of inclusive, sustainable, and community-centered urban development that considers social dynamics in shaping public environments.

When discussing the production of space in Amman, we can find a few written works of literature that attempt to understand this phenomenon. Khawaja (2015) wrote about the influence of social and economic practices in creating public spaces in Amman and believed that Amman's public spaces were currently under threat by becoming privatized and subjected to legislative constraints, especially when they were in proximity to powerful institutions. Schwedler (2012) extensively discussed the social representation and public space in Jordan. Schwedler explored the act of protest by examining the specific spaces of contestation. Schwedler agreed with Khawaja's argument that privatization of public space produces spaces that are policed and controlled more stringently. She gave an example of projects like Abdali Boulevard, and she concluded that these new forms of privately owned public space were not built to dissuade protests, but the effects are still there (Khawaja, 2015).

Schwedler persisted in their investigation of protest politics in Jordan, contending that the selection of public spaces for political protests is not solely based on facilitating mobilization or the symbolic signifi-

cance of the location but also on the protest's potential to disrupt ongoing economic activities and its visibility (Schwedler, 2012). This notion aligns with the study conducted by Al Tal (2006), who examined the relationship between political power and spaces—their representation and identification—and concurred with Al Tal that the development of the city of Amman occurred within the/ framework of 'nation building'. Aljafari (2014) and Al Tal (2006) offered a comprehensive narrative of Amman's urban spaces and their production, reproduction, and co-production in a way that summarizes the main themes of the works that came before the increasing role of the private sector in managing and controlling public spaces.

Shtaya and Ghodieh (2019) addressed the differences in activities and practices between the modern spaces in the Abdali project and the old traditional spaces in the old city center. Another study by Aljafari (2014) investigated one of Amman's most prominent public spaces.

Despite existing literature on socially constructed environments or "common making" of public space, Amman's lack of open environments has drawn criticism, prompting the Greater Amman Municipality (GAM) to consider expanding these areas.

Amman's built environment is typified by its limestone facade, little greenery, and vast, mostly auto-dominated road system. The GAM's Comprehensive Development Plan, created in 1987, is centered on controlling future growth and suggests updating the Open Space System to encourage social interaction. Despite these attempts and initiatives, the common modern designs of Amman's public areas remain controversial.

This study highlights that the issue is not simply a lack of spaces but rather the absence of significant areas that truly represent the populations they serve. It is crucial to consider the environments that arise from collective social action. The modern public space designs in Amman often generate controversy as they fail to acknowledge the existing unofficial public areas that serve as important gathering spots for the community.

This research explores Amman's public spaces as socially constructed environments, focusing on their meanings and functions as influenced by social behaviors. The study aims to identify the socio-spatial changes that shape the city's urban fabric and reveal shortcomings in current urban planning practices regarding meeting the population's needs and identities.

5. Materials and methods

This study employed two primary methods:

1. Qualitative coding using the MAXQDA software.
2. The Space Syntax Theory (SST) method, analyzed through the Depth Map X program.

The first method was derived from the grounded theory, which begins with a data collection and analysis cycle. Space Syntax is a set of theories and techniques examining spatial configurations and their relationship with societal behavior (van Nes, 2014).

The primary data sources for this research were selected newspaper articles, known for their thorough, objective reporting and fact-checking. These articles effectively captured social events impacting the Jordanian population from 2010 to 2019. The time frame was chosen due to the political changes occurring in the Middle East at the time. Prominent Jordanian dailies, such as Al-Ra'y, Al-Dustour, and the Jordan Times, were used. The articles were pulled from the newspaper's official online archives using relevant keywords in both Arabic and English.

Aerial maps for the selected case study were obtained from Amman's Explorer Geographic Information System websites, specifically Mustakshif "Amman," and verified with Google Maps for accuracy. Then, walking distances and traffic flow were integrated into the analysis through AutoCAD.

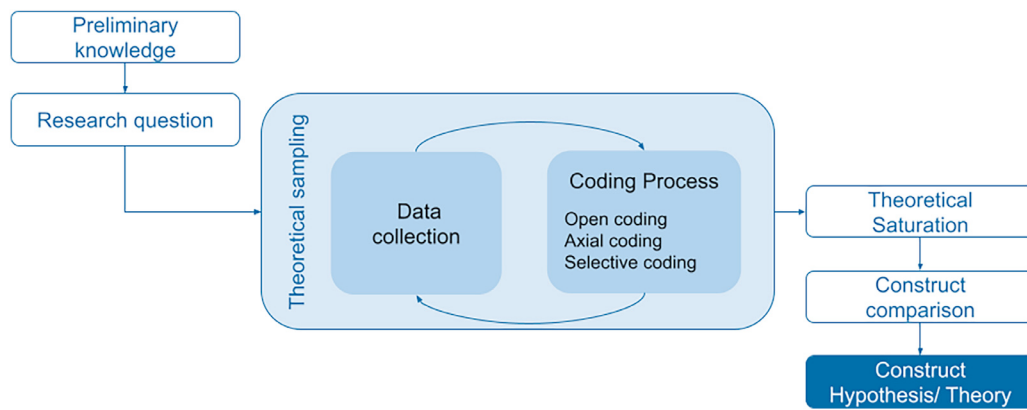


Fig. 2. Grounded theory methodology.

While the study offers important insights, several limitations should be acknowledged. One concern is the reliance on primary data from newspaper articles, which may introduce bias due to the influence of media framing on event portrayal. The selected publications—*Al-Ra'y*, *Al-Dustour*, and *The Jordan Times*—may not fully represent the breadth of socio-political perspectives within Jordan. Another limitation relates to the study's time frame scope (2010–2019), which may overlook recent developments that could significantly impact the country's spatial and social dynamics. Additionally, static maps and archival news sources may limit the ability to capture real-time urban changes or evolving socio-spatial patterns after 2019.

6. Practical section: applying research methodology to the case study

6.1. Coding method derived from the grounded theory approach

Grounded Theory (GT) begins with data collection to develop theories, refining data through each analysis cycle. This theoretical sampling process organizes raw data excerpts into attribute-based groups to formulate theories; see Fig. 2.

After completing the initial axial coding, connections among highlighted codes emerged. MAXQDA provided tools to visualize these relationships, displaying the frequency of keyword intersections within document extracts. Color-coded segments facilitated the visualization of these connections. Each type of information was coded into separate segments, visualized as tables or maps generated by MAXQDA.

As shown in Fig. 3, the codes were color-coded to signify different meanings. For example, the yellow ones refer to the names of locations. The blue-coded ones refer to any mentions of time. The orange ones refer to the issues being represented within space.

In summary, news articles on protest events were gathered, converted to PDF, and imported into MAXQDA for analysis. Each transcript was reviewed, allowing excerpts containing spatial, social, temporal, and behavioral information to be highlighted and coded. Contextual notes were added, resulting in 926 coded segments categorized into seven main groups: place (protest location), time (date of protest), cause (issues contested), type (protest activity type), group (organizers), behavior (disruption level), and size (assembly size).

At the end of this stage, there were 27 sub-groups in total, organized within six main groups distributed as follows (Table 1):

The program then generated the code analysis map (the size of the Circle indicated the number of times the word was mentioned, and the lines meant the two codes were mentioned in the same document/article, and the number indicated how many times they were mentioned). The resulting map revealed three main clusters, grouped around Downtown Amman and the 4th Circle, indicating their prominence as key sites for socio-political representation.

Table 1

The color and number of coded segments of each main group.

Colour	Group	Number of codes
Yellow	Place / location	188
Orange	Causes /Issues being represented	113
Green	Type of protest	77
Blue	Time	248
Red	Size / number of participants	39
Purple	Behaviour	132

As seen in Fig. 4, the protest event that took place in and around the 4th Circle happened more frequently on Thursdays (10 intersections), and was regarding economic issues (15 intersections), and took the form of sit-ins (11 intersections). On the right we can see the cluster of coded segments regarding the Downtown area, that events that took place in that area occurred more often on Fridays (20 intersections), these assemblies took the form of marches (10 intersections) and rallies (9 intersections), and the issues being represented in the space were more regarding the Palestinian cause (8 intersections).

6.2. Space syntax method

Space syntax is a mathematical street network model for calculating topological spatial relationships. Space syntax is a set of techniques for analyzing spatial layouts and human activity patterns in buildings and urban areas. It is also a set of theories linking space and society. Space syntax is founded on two fundamental propositions. The first is that space is not a background to human activity but is intrinsic to it. Second, that space is configured by what happens in any individual space, which is inherently influenced by the relationships between that space and the network of spaces to which it is connected. Space syntax analysis is strongly linked to the concept of space as an assemblage. It is a largely structuralist critique of spatial structure. Particularly in its investigation of spaces as forms of social reproduction. The measures of space syntax are:

1. Connectivity: a static local measure that refers to the number of immediate neighboring streets connected to space.
2. Depth: represents the number of changes in direction from one point (origin) to another (destination). It represents the level of integration of space. The higher the depth, the lower the integration.

According to the area-perimeter ratio, these measurements produce the 'fewest lines' axial map as the minimal set of abstracted lines that cover the largest convex spaces. This technique renders the complexity of the urban fabric in a simplified lines map connecting a set of origins and their destinations (see Fig. 5).

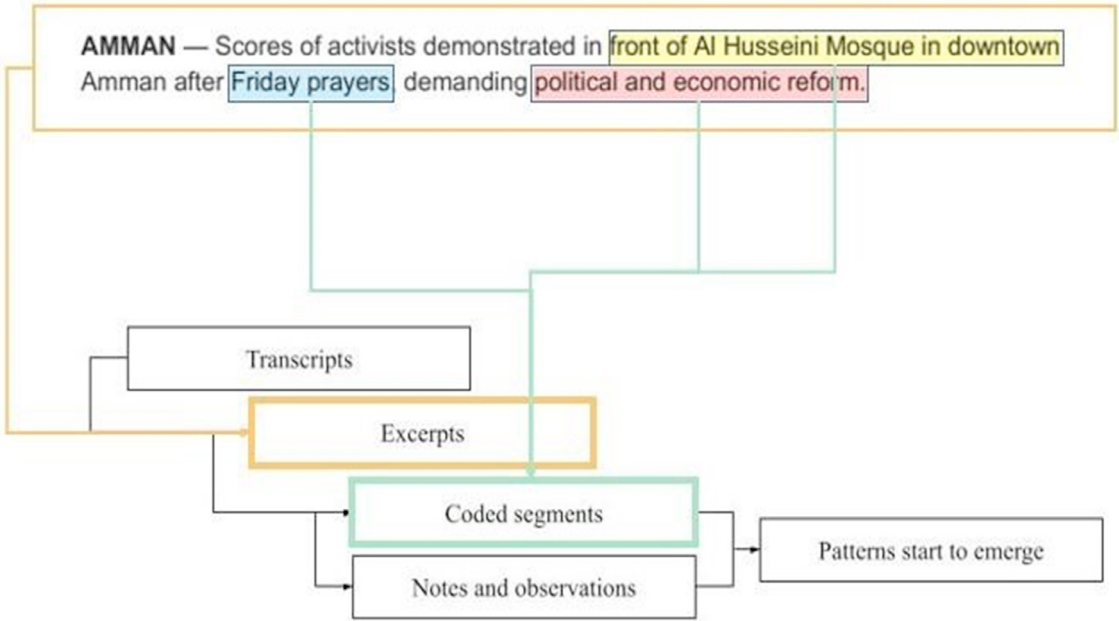


Fig. 3. Coding process.

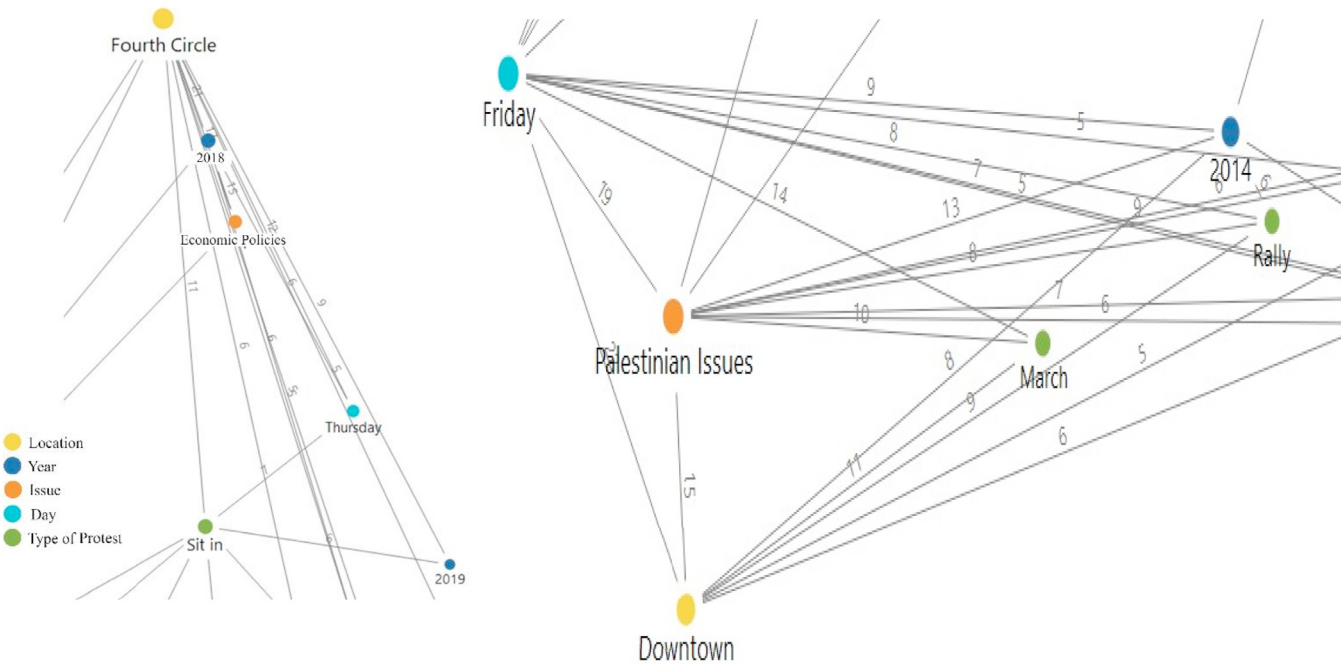


Fig. 4. A code map was created in the MAXQDA program for the fourth circle (left) and the downtown area (right).

The methodology employed in this study consists of the following steps:

- a) Collection of Maps: Acquire maps of the designated study areas from the Greater Amman Municipality. These maps may be obtained in various formats, including CAD files, GIS maps, or printed materials, which will subsequently be redrafted as CAD files. A comparative analysis will be conducted against the most recent Google Earth images to ensure the utilization of the most current versions.
- b) Utilization of Depthmap X Software: Employ Depthmap X, an open-source software application for calculating space syntax. This program generates a simplified straight-line network of open areas within the environment and produces an unbiased map suitable for analyzing spatial shape and function.

- c) Assessment of Connectivity and Depth: Evaluate the connectivity and depth of each line represented in the axial map (Fig. 6).

7. Results of applying the methods: implications of the study

From the initial analysis, Lefebvre’s triad has been observed in the connections between space and social events, noting how different patterns of social encounters are linked to various urban spaces. Keywords like "rally" and "march" often describe the social practice in the downtown area, an area that has organically expanded through time and is seen by the public as a historical and religious hub that belongs to the people (representational space).

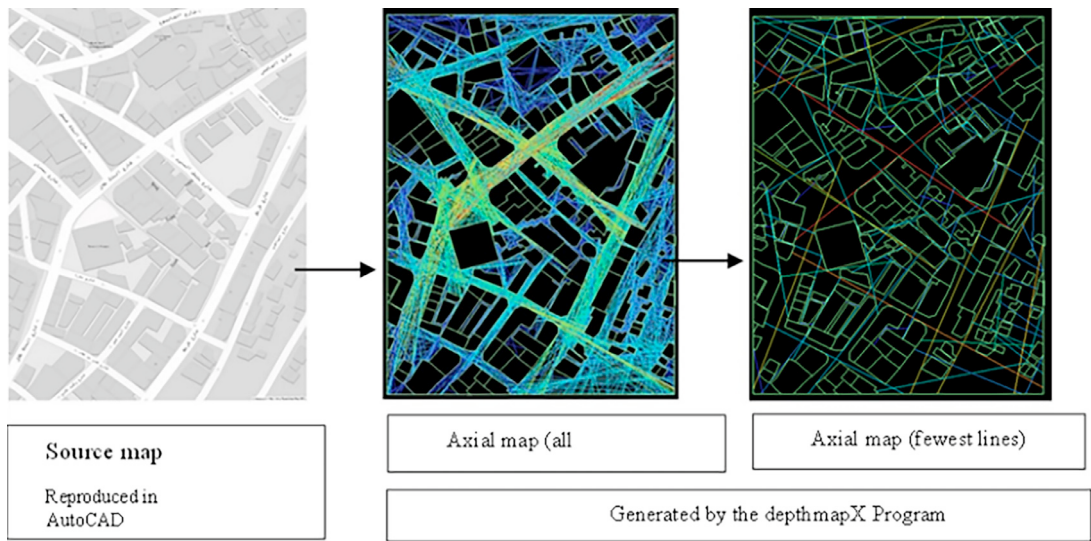


Fig. 5. The generation of the axial maps.

The protests (marches/rallies) in the downtown primarily took place on Fridays, highlighting the area’s role as a space for expressing collective religious and historical identities. The focus on Palestinian issues in this setting underscores their symbolic importance as a site of collective memory (Jovchelovitch, 2001).

The protests at 4th Circle (sit-ins and stand-ins) focused on economic grievances, highlighting the significance of this area as a state-planned traffic hub linked to political and civic authority, including government offices and organizational headquarters. This location has evolved into a contested space for representation. The disruptive character of these protests (Table 2) shows how social representation disrupts existing spatial norms, aligning with Purcell assertions (2022).

The MAXQDA program represents the codes in a visual diagram. The distance between each code forms groups or ‘clusters’ based on how closely linked each code is to the other (how often the codes are mentioned in the same article). Line thickness is another visual indicator of that relationship, see Fig. 7.

The first two clusters shown in Fig. 7 are centered around two locations, the 4th Circle and the downtown area, indicating that they were the most frequently referenced spaces for protests. In contrast, the third cluster comprises additional political and civic power locations, such as foreign embassies and significant mosques, which, while mentioned less

Table 2
The main codes and connections found in the previous ‘clusters’.

Main group	Code	Number of codes Downtown	Number of codes 4th Circle
Day	Thursday	0	10
	Friday	22	7
	Saturday	1	5
Issues being protested	Palestinian	16	2
	Local	10	22
Shape of protest	Rallying	9	0
	Marching	11	2
	Sit-ins	2	11
Type of behaviour	Non-Disruptive	4	5
	Disruptive	5	16

often, were also utilized. This study will focus on Cluster 1 and Cluster 2.

By examining the coded ‘clusters,’ it is observed that, in addition to spatial elements, the codes encompass a temporal dimension, the types of issues being represented, and behavioral patterns. They are also linked to similar locations where protests addressing the same issue co-occur, see Table 2.

These results support Lefebvre’s claim that space is not neutral but the result of dialectical tensions between design (thought) and appro-

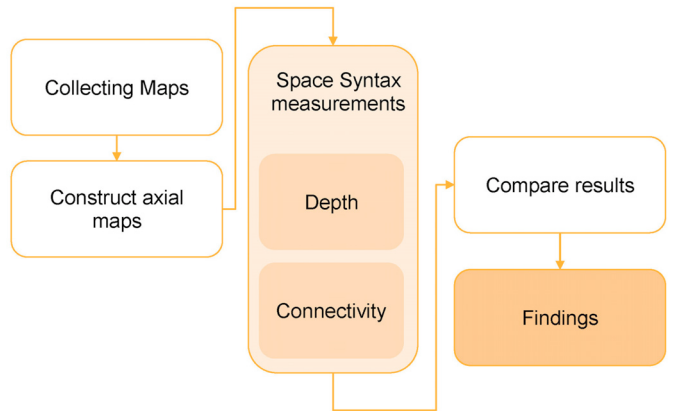


Fig. 6. Figure showing the steps of the study methodology.

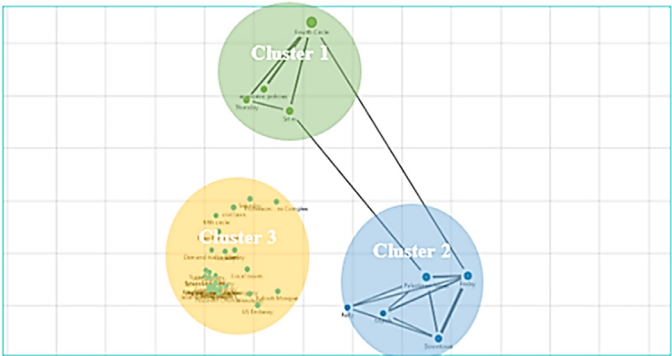


Fig. 7. Main groups formed in the first stage of coding.



Fig. 8. Aerial view of the downtown area.

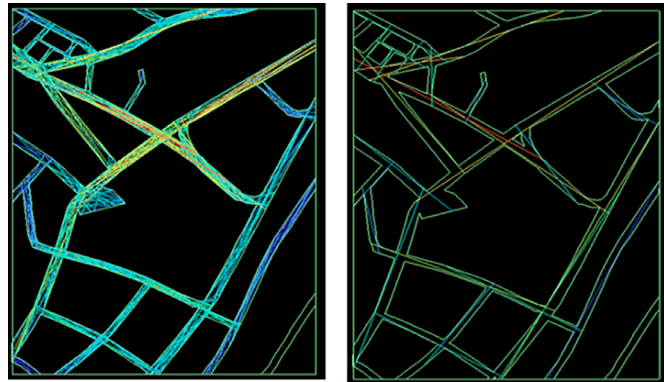


Fig. 9. Axial maps of the GHM Plaza using DepthmapX program.

priation (experience), which links the coding process’s results with the theoretical framework.

7.1. Results of space syntax

First, when the articles discussed the protest downtown, the space was ample and narrow. The protest would usually rally in the Grand Hussaini Mosque (GHM) plaza—often after the Friday prayers—and then march along King Talal St., chanting and carrying banners, eventually arriving at Al-Nakheel Plaza, see Fig. 8. For this study, the downtown area was divided into two main spaces: the GHM Plaza and Al-Nakheel Plaza.

The images shown in Fig. 9 below are the axial maps generated for the Grand Hussein Mosque Plaza in the downtown area. These maps were created using the Depthmap X program. Table 2 shows the measurements taken from the fewest lines of the axial map of the GHM Plaza, as calculated in the Depthmapx program. The axial map for the plaza contains a total of 6 lines. It also has a relatively high depth indicator, which means the area is less connected to the surrounding urban fabric (Tables 3 and 4).

As for Al-Nakheel Square, space underwent three major changes between 2005 and 2022. Between 2005 and 2018, new roads were opened, and old ones were expanded. In 2019, GAM started working on a new

Table 3
Space syntax measurement for the grand Hussein mosque plaza.

Attribute	Value
Connectivity	0.44
Integration [HH]	0.44
Mean depth	0.36

Table 4
Space syntax measurements for the Nakheel square.

Attribute	Value
Connectivity	0.40
Integration [HH]	0.66
Mean depth	0.20

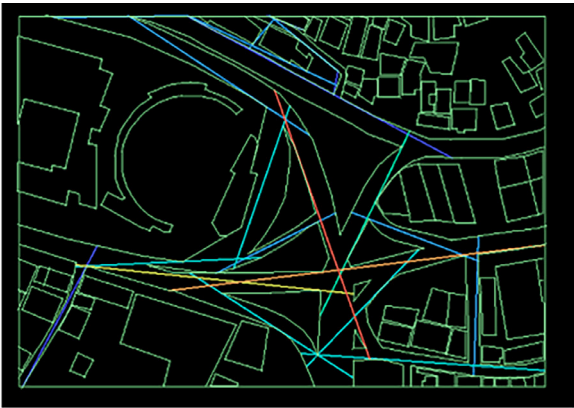


Fig. 10. Axial maps of Al-Nakheel square using the depth map X program.

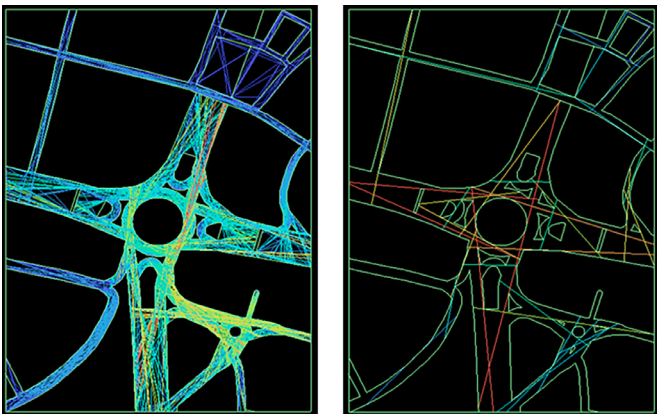


Fig. 11. Axial maps of the 4th circle area using the depth map X program.

bus terminal built at the edge of Al-Nakheel Square. Fig. 10 shows the analyses the recent map of the area in 2022.

Below are the axial maps for the 4th circle area (Fig. 11). The map with the fewest lines (right) includes 15 lines and shows a significantly higher connectivity value compared to the previous downtown area spaces (Table 5).

The result of the coding method showed that for protests, the functional, political, and cultural symbolism and significance of a public space influence the type and size of a protest, and the issues presented in that space. It also showed that the nature of a protesting activity occurring in a public space and its outcome influence the symbolism and significance of that public space. It could even add new meanings to that space that did not exist before, like what happened with the

Table 5
Space syntax measurements for the 4th circle.

Attribute	Value
Connectivity	6.70
Integration [HH]	0.70
Mean depth	0.12

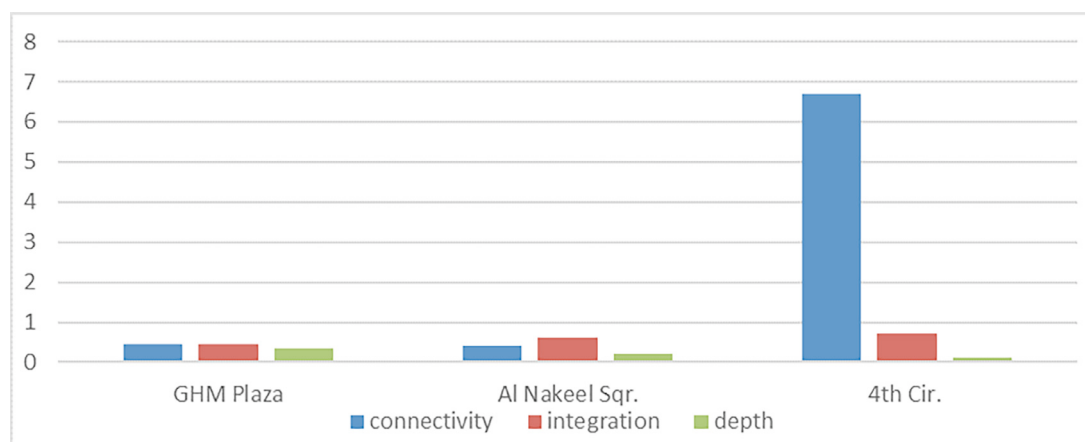


Fig. 12. Comparison of space syntax values between GHM Plaza, Al-Nakheel square, and the 4th circle.

4th Circle during the teachers' protest, where space became the topic of contestation and the leading cause. The symbolism of space and the major disruptive events that took place within them have changed how people perceive and use these spaces, which confirms Lefebvre's theory of the dialectical interplay among its triad (perceived, imagined, and experienced) and social representations that exist in Amman's protest spaces.

According to the analysis above, the GHM Plaza and Al-Nakheel Square had connectivity values of around (0.40, 0.44), which is considered low connectivity, and due to each of those squares having a high historical-religious symbolism, exemplifying lived space—appropriated through Friday marches for Palestinian causes, reflecting collective memory which is consistent with Jovchelovitch (2001). In contrast, the 4th Circle's high connectivity (6.70) and its location near the government institutions make it a planned place designed for traffic efficiency. However, protesters re-perceive it only as a site of opposition through sit-ins. Furthermore, despite the redesign of Al-Nakheel Square in 2019 and its role in increasing integration, which was 0.66 according to the above space syntax findings, it failed to attract protests, demonstrating that social representations take precedence over physical dimensions (Fig. 12).

8. Results and discussion

The analysis of the three main squares in Amman aligns with Lefebvre's theory that space is neither neutral nor fixed but is influenced by sociopolitical dynamics (Lefebvre et al., 1991). It also emphasizes the significance of the site's location and physical features. For example, spacious open areas are ideal for public events, while long, narrow roads are proper for marches and parades. Logically, larger crowds require more space and wider streets. However, despite the 4th Circle and Al-Nakheel Square being larger than the plaza in front of the GHM in downtown Amman, the latter remains the primary gathering space. This indicates that the social function of a space is more intricate than merely its physical dimensions.

On the other hand, Amman's central square, the plaza in front of the Grand Hussein Mosque, holds considerable symbolic and historical importance, making it an expected venue for gatherings and protests, infused with power, memory, and emotion. Its long-standing centrality, bolstered by prominent landmarks like the GHM, the Amanah building, and the Jordan Museum, illustrates how social and historical significance can outweigh physical size in influencing public spaces. This aligns with Lefebvre's theory, which highlights the interconnectedness of spatial practices and social representations and can be viewed as beneficial.

However, focusing on historical centrality might overlook the evolving needs of a modern city. While GHM Plaza is a popular site for protests due to its symbolic significance, more recent locations like the 4th Circle have also become contested spaces, precisely due to their closeness to government institutions. This situation prompts an inquiry into whether Amman's urban planning adequately anticipates or accommodates spontaneous social movements. Additionally, an overreliance on historically significant areas could marginalize newer or less central neighborhoods, thereby perpetuating spatial inequalities. While the ongoing use of GHM Plaza for protests highlights the power of collective memory, aligning with Madanipour (2015) perspective, it may also raise concerns about potential rigidity within Amman's urban fabric.

Due to their modern infrastructure and connectivity, places like the 4th Circle are more accessible to a broader range of people. However, their design prioritizes vehicular efficiency over pedestrian engagement, diminishing their potential as inclusive public spaces. Consequently, these spaces hold less significance. Although Amman has many spaces like this one, a few are designed to accommodate the changing demands of social representation. This tension between historical legacies and practical modernity reveals a flaw in urban planning.

Regarding the findings of the Space Syntax Theory (SST), it became evident that spatial configuration affected the nature of protests: areas with lower connectivity tended to host marches and rallies. In comparison, those with higher connectivity indexes were more suitable for sit-ins. However, the results were not definitive, as other significant factors also played a role in determining the type of social activity in any given space, which were not accounted for in the SST.

Expectedly, all the locations typically selected for protests are public spaces, as we have already established that accessibility and a sense of communal ownership are essential for facilitating social representation. However, it seems that there are varying interpretations of what constitutes a public space from the viewpoints of those involved in the different assemblies.

From the previous analysis, we can conclude that social activities create and sustain public spaces in Amman. The social production of space in the city involves a complex interplay of factors in a dialectical relationship, with the physical attributes of space being just one component. While Amman is not lacking in urban spaces, there is a deficiency of significant public areas that are shaped by the collective community. Additionally, minimal focus has been on the few socially produced public spaces, resulting in a socio-spatial gap in Amman's urban fabric.

The 4th Circle and Al-Nakheel Square are much larger than GHM Plaza and are commonly utilized for various gatherings, such as festivals and public ceremonies. This situation illustrates how Amman's urban governance struggles to address different dynamics, leading to the fragmentation of lived spaces. This disconnect highlights the neces-

Table 6
The key moments of the production of space in Amman are two major protest locations.

Lefebvre's Triad	GHM Plaza	4 th Circle
Spatial Practice	Friday prayers, Shopping (Pedestrian oriented)	Driving (Vehicle Oriented)
Representations of Space	Evolved and expanded through time	Designed as part of a master plan to organize traffic in the city
Representational Spaces	A historical, religious center, the city's heart is seen as belonging to the people.	Political and civic significance, a place of constant contestation.

sity for participatory planning that embraces social representations, as Habermas (1989) suggested.

In conclusion, we can identify the key moments in the production of space in Amman, focusing on two significant protest locations, as shown in Table 6.

9. Conclusion

This study examined the interplay between social representation and public space production in Amman, Jordan, using Henri Lefebvre's triadic framework of conceived, perceived, and lived spaces to structure the narrative. By analyzing protest activities in two key sites—Downtown Amman and the 4th Circle—and anchoring the analysis within a defined temporal period (2010–2019), the research revealed how social practices dynamically reshape urban spaces, infusing them with new meanings and functions.

By examining Amman's spatial evolution through perceived space—the physical environment influenced by planners—this study emphasizes the spatial and symbolic importance of areas such as Downtown and the 4th Circle. It highlights key sociopolitical moments in the city. It explores how protesters engage with urban spaces, revealing that the movement patterns of protesters often reflect their sense of ownership or alienation towards prominent and well-connected locations. The research demonstrates how socially significant sites, including squares, streets, plazas, and mosques, serve as venues for public protests that illuminate the intricate sociopolitical dynamics within Amman's urban fabric. For example, protests in downtown areas are sometimes referred to as "marches," suggesting a ceremonial significance and a sense of public ownership like military parades in the past. On the other hand, protests at the 4th Circle are frequently referred to as "rallies" or "sit-ins," which reflects their perceived affiliation with institutions of power and their estrangement from the public. These differences are further highlighted by the terminology used in media coverage, where words like "critical" and "vital" highlight how sensitive and disruptive the 4th Circle is because of its high connection and function as a crucial traffic junction.

The findings demonstrate that public spaces in Amman are not static entities but are constantly (re)produced through social action. For example, the Grand Hussein Mosque Plaza (Downtown) and the 4th Circle are places where sociopolitical tensions can be expressed through protests, marches, and sit-ins, embodying Lefebvre's "lived space" concept. The downtown area's historical and religious symbolism encourages demonstrations and marches, fostering a sense of community ownership. In contrast, the 4th Circle's high connection and proximity to political institutions make it a hotspot for disruptive sit-ins, emphasizing its contested nature.

The study also recognized the temporal rhythms that further influence these dynamics, noting that most protests occur on Fridays, capitalizing on the day's religious and social significance. Consequently, the aspect of time is also important. The phrase "Downtown's Friday" (Jum et al-Balad) emerged during the peak of the protests in 2011, along with Thursday gatherings at the 4th Circle, which were associated with economic grievances. These patterns highlight how social representations

are intertwined with both spatial and temporal elements, ultimately shaping and being shaped by urban design and governance.

The study critically highlights a disconnect between top-down urban planning and social practices. While Amman has a wealth of public spaces, many do not foster inclusivity or meet the community's changing needs. Supporting Schwedler (2009) findings, the class structure of neighborhoods and the spatial dynamics of power play a significant role in shaping protest paths.

This discrepancy emphasizes planners' need to acknowledge the interdependent relationship between space and society, shifting away from purely functionalist approaches to adopt participatory and adaptive strategies. Space syntax metrics, such as connectivity and integration, further underline this necessity by showing how visibility and frequency of use determine a space's role in social representation. The more integrated a space is, the greater its connectivity and pedestrian traffic, which increases the likelihood that events occurring in that space will receive public attention.

Recommendations

Based on the preceding analysis highlighting the complexities of urban space production and the need for inclusive public environments, the following recommendations offer concrete strategies for policymakers and planners in Amman and potentially other Middle Eastern cities. These proposals emphasize participatory approaches, the recognition of diverse spatial meanings, the establishment of "rights to the city" frameworks, the protection of public spaces from privatization, the creation of flexible urban environments, and the necessity for expanded regional research into post-2019 socio-spatial dynamics.

- Participatory Urban Planning: Although policymakers and planners have started to include community involvement in the design of public places, more work is required to watch and comprehend how areas are utilized and valued to ensure they reflect diverse social representations.
- Understanding the diverse meanings associated with spaces and their sociopolitical significance over time can facilitate the development of urban environments that are more inclusive, impactful, and socially dynamic. Utilizing ethnographic and qualitative methods, such as community workshops, can effectively capture residents lived experiences and needs.
- Establish "rights to the city" frameworks emphasizing public ownership and democratic use. To maintain equity and inclusiveness, the planning and development of public spaces require the active engagement of the community on the economic and political levels
- Policymakers need to acknowledge the critical role of enacting policies that limit the privatization of public spaces to maintain their accessibility for communal expression. This privatization significantly contributes to the exclusion of specific segments of society and disrupts the social dynamics of space production.
 1. Plan for flexible, multi-functional places that can support daily activities and protests while also improving connection and retaining the lived symbolism of famous spaces to decentralize protest hubs and promote spatial fairness.
 2. Expand studies to incorporate post-2019 socio-spatial dynamics, focusing on comparing Amman's instance to other Middle Eastern cities to uncover regional patterns in space-production issues.

Conflict of interest

The authors declare no conflict of interest.

CRedit authorship contribution statement

Anwar F. Ibrahim: Supervision, Project administration, Conceptualization, Writing – review & editing. **Mayas Nadim Ahmad Taha:**

Writing – review & editing, Supervision, Resources, Methodology, Investigation, Formal analysis, Data curation. **Duha Dawood Hussain Shqeirat**: Software, Investigation, Conceptualization, Writing – review & editing.

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